

WHAT IS CLAIMED IS:

1. A method for manufacturing a semiconductor device comprising the steps of:

5 preparing a semiconductor substrate defined as an active region and a field region;

forming a number of word lines in the active region and the field region of the semiconductor substrate;

depositing an insulator film over the upper part of a structure to insulate word lines;

10 patterning the insulator film to open word lines of the active region whereby forming a landing plug contact;

depositing a poly silicon film to fill up the landing plug contact;

performing a first polishing process using slurry including a first doping material and flattening the poly silicon film only, whereby exposing
15 the insulator film; and

forming a landing plug by performing a second polishing process using slurry including a second doping material and by flattening all the upper part of the structure.

20 2. The method of claim 1, wherein the first doping material is boron.

3. The method of claim 2, wherein the concentration of boron is in the range of 2wt% to 5wt%.

4. The method of claim 1, wherein the second doping material is phosphorus.

5. The method of claim 4, wherein the concentration of phosphorus is
5 in the range of 2wt% to 5wt%.